

REMARKS

Claims 1-4, 6-9, 14-15, 18-20 and 22-25 are pending in the present application.

Claim Amendments

Claim 10 is cancelled and the limitations thereof added to claim 1. Claim 1 is also amended to state that the thin fiber has a fineness of from 1 to 5 dtex. Support for this limitation resides at page 12, line 14 of the specification. Claim 18 is amended accordingly. New claims 24 and 25 are added, support for which resides at page 5, line 9 to page 6, line 9 of the specification. No new matter is added by this amendment.

Request for Interview

The undersigned attorney requests a personal interview with the Examiner to discuss the above amendments and the following distinguishing comments.

The Present Invention and Its Advantages

By way of review, the claimed invention is directed to a cleaning sheet, which comprises a liquid retentive sheet and at least one air-laid non-woven fabric provided on at least one side of the liquid retentive sheet. The liquid

retentive sheet comprises cellulosic fiber in an amount of from 30 to 100% by weight based on the weight of said liquid retentive sheet, with the liquid retentive sheet and the non-woven fabric being laminated to each other, the non-woven fabric having 30 to 100% by weight of thick thermoplastic fibers having a fiber length of 2 to 15 mm and a fineness of 10 to 150 dtex, 1 to 50% by weight of thin *crimped* thermoplastic fibers having a fiber length of 2 to 15 mm and a fineness of *1 to 5 dtex*.

The air-laid non-woven fabric has a number of tips of the thick thermoplastic fibers forming the non-woven fabric exposed on the surface of the cleaning sheet to have the capability of scouring or scraping dirt off of a soiled surface, wherein the number of tips of the thick thermoplastic fibers is 20-4000/cm², having intersections of the thick thermoplastic fibers together with intersections of thick thermoplastic fibers and thin thermoplastic fibers, said intersections of the thick fibers and the intersections of the thick and thin fibers being bonded by fusion or with a binder, and wherein the non-woven fabric has a basis weight of from 30 to 200 g/m².

In a preferred embodiment, the thick fiber comprises a core/sheath conjugate fiber having a polyester core, or a polyester fiber.

The now-claimed invention is neither disclosed nor suggested by the cited prior art.

Rejection of Claims 1, 9-10, 13-15, 18 and 21-23 Under 35 USC 103(a)

Claims 1, 9-10, 14-15, 18 and 22-23 again stand rejected under 35 USC 103(a) as obvious over JP 2000-212866 in view of JP 03-279452 or JP 02-112460, further in view of Textile Glossary. This rejection is respectfully traversed to the extent deemed to apply to the claims as amended.

In response, as noted above, claim 1 is amended to recite the limitations of cancelled claim 10, as well as to further define the fineness of the thin fibers which are employed. New claim 24 is also added directed to a thick fiber comprising a core/sheath conjugate fiber having a polyester core, and new claim 25 is added directed to a thick fiber comprising a polyester fiber.

Applicants again note that none of the cited art relied on by the Examiner teaches or provides for *a cleaning sheet* as instantly claimed and in no way provide any motivation to arrive at the same.

More particularly, none of the cited art teach or provide for a cleaning sheet comprised of a liquid retentive sheet and at least one air-laid non-woven fabric provided on at least one side of the liquid retentive sheet. The liquid retentive sheet comprises 30 to 100% by weight of cellulosic fibers. The non-woven fabric preferably contains a *combination of* (i) *thick thermoplastic fibers* having a fiber length of 2 to 15 mm and a fineness of 10 to 150 dtex, (ii) *thin crimped thermoplastic fibers* having a fiber length of 2 to 15 mm and a fineness

of 1 to 5 dtex, and (iii) wherein 20 to 4000/cm² tips of the *thick fibers* are exposed on the surface of the cleaning sheet.

Further, not only does the claimed nonwoven fabric have intersections of the thick fibers, but also intersections of the thick and thin fibers (see claim 1). The respective intersections of fibers are bonded by fusion or with a binder. This prevents the thick fibers from falling off, while improving scraping properties of the material.

Applicants' invention is neither disclosed nor suggested by the cited prior art.

JP '866 teaches a fiber mat comprised of cellulosic fibers and heat-bondable synthetic fibers. The mat may also be bonded or laminated to another mat comprised of synthetic or natural fibers.

The fiber mat of JP '866 may be nonwoven, which may be an air-laid nonwoven fabric, containing heat-fusible bicomponent fibers having specific affinity to cellulose and cellulosic fibers. The nonwoven fabric is used for a wipe for absorbing liquid and a liquid absorber. It is known in the art that conventional heat-fusible fibers do not exhibit high strength of thermal bonding to cellulosic fibers, since synthetic resins have a low affinity to cellulose.

To the contrary, the heat-fusible fiber of the reference is characterized by high strength of thermal bonding to cellulosic fibers. In contrast, JP '866 is

characterized by the use of a special heat-fusible bicomponent fiber having high affinity to cellulose.

The reference is silent with respect to removing soil from a solid surface by scouring or scraping by thick fibers. The reference also fails to teach or suggest the use of thick and thin fibers in combination, together with cellulosic fibers. Indeed, the Examiner acknowledges that the reference fails to teach the presence of “thin” fibers.

JP ‘452 and JP ‘460 are cited to teach the combination of thick and thin fibers in a textile sheet which may be a non-woven sheet. However, the references are silent with respect to the presence of cellulosic fibers in the sheet as now claimed.

JP ‘460 is directed to a sheet used as a filter material, bacteria barrier material, liquid-absorbent material, etc. The sheet of JP ‘452 is the same as for JP ‘460. The sheets of JP ‘460 and JP ‘452 are used for a different purpose than the sheet of JP ‘866. Accordingly, one of ordinary skill in the art is provided no motivation by the JP ‘460 and ‘452 references in relation to JP ‘866. JP’ 866 is directed to an air-laid nonwoven fabric, while JP ‘460 and JP ‘452 each teach meltblown nonwoven fabric. No reason exists to employ both thick *and* thin thermoplastic fibers used in the *meltblown* nonwoven fabric as the thermoplastic fiber used for an *air-laid* nonwoven fabric.

In addition, the sizes of the thick and thin fibers disclosed in these two references do not fall within the claimed range.

For example, in Example 1 of JP '460, a melt-blown polypropylene fiber of 1.7 μm (thin fiber) and a polyethylene fiber of 25 μm (thick fiber) are used. These fiber sizes correspond to 0.02 *dtex* for the melt-blown polypropylene fiber and 4.5 *dtex* for the polyethylene fiber, based on a density of 0.9 g/cm³ for polypropylene and 0.92 g/cm³ for polyethylene.

JP '452 discloses that the thin fiber has a diameter of from 0.1 to 8 μm . In the conversion of μm to *dtex*, and assuming that the resin is PE/PP, a dimension of 8 μm equals a *maximum thinness of 0.5dtex*. The assumption that the resin is PE/PP for the thin fiber is based on the example of JP '452 which employs PE/PP as the resin for the thin fiber.

More specifically, in Example 1 of JP '452, a melt blown polypropylene/polyethylene (PE/PP) fiber of 2.0 μm (thin fiber) and a polypropylene fiber of 6 deniers (thick fiber) are used. These fiber sizes correspond to about 0.028 *dtex* for the melt-blown polypropylene/polyethylene (PE/PP) thin fiber and 6.6 *dtex* for the polypropylene thick fiber.

By contrast, applicants' claims provide for a thick fiber of 10 to 150 *dtex* and a thin fiber of 1 to 5 *dtex*. The references thus do not exemplify the use of a thick fiber as claimed, with the exemplified "thick" fibers being from 34-55% or so smaller than required by applicants' claims.

JP '460 similarly discloses the use of thin fibers of a diameter of 0.1 to 8 μ m, with 8 μ m corresponding to a maximum dtex value of 0.5. Again, this value is 50% of the now-recited dtex value of 1 for the thin fibers recited in amended claim 1.

Claim 1 generally corresponds to the embodiment of Figure 2 – i.e., a nonwoven fabric having a first layer having 30-100% by weight of thick thermoplastic fibers (as defined) and 1-50% by weight of thin thermoplastic fibers (as defined), and a second layer comprised of 30 to 100% by weight of cellulosic fibers, with the first layer having a number of tips of the exposed thick fibers in the range of 20 to 4000/cm².

The embodiment of claim 1 is neither disclosed nor suggested by the cited prior art. While JP '866 teaches at claim 13 the combination of the nonwoven layer with, for example, a cellulose fiber layer, the reference is otherwise silent regarding the other limitations of the claims.

Further, none of the cited prior art teaches or suggests the use of **crimped** thin fibers in a cleaning sheet as now claimed (see amended claim 1). While JP '456 and JP '462 teach the crimping of fibers, the references limit their teachings to the crimping of thick (as opposed to thin) fibers. Applicants have found that the use of crimped thin fibers enhances the bulkiness of the resulting cleaning sheet, and hence, the tactile nature of the cleaning sheet as discussed at page 12, lines 27-28.

Further advantages result from the use of a thick fiber comprised of a core/sheath conjugate fiber, or a polyester fiber, and particularly where the core portion of the fiber is polyester (new claims 24 and 25).

The Examiner states that the use of crimped thin fibers would be obvious for the same reason thick fibers are crimped in JP '866. Applicants disagree with this conclusion of the Examiner.

JP '866 uses crimped thick fibers to improve adhesion between the thick fibers and cellulose fibers, and to prevent the cellulose fibers from falling off from the sheet (paragraph [0021] of the reference). This reason is clearly distinct from the reason applicants employ crimped *thin* fibers as discussed above – to increase bulk and enhance tactile properties. Thus, it is not obvious, based on the teachings of the reference, to employ *crimped thin* fibers in the manner asserted by the Examiner.

Accordingly, since the cited art references do not teach or otherwise provide for each of the limitations recited in the pending claims, it follows that the cited art cannot render obvious the same. Likewise, because the cited art references do not provide any motivation for that would allow one of ordinary skill in the art to arrive at the instant invention as claimed, they cannot support an obviousness rejection of independent claim 1, and the accompanying dependent claims.

The rejection is thus without basis and should be withdrawn.

Rejection of Claims 2, 11, 19 and 20 Under 35 USC 103(a)

Claims 2, 11, 19 and 20 again stand rejected under 35 USC 103(a) as obvious over JP 2000-212866 in view of JP 03-279452, JP 02-112460 and Kakiuchi et al. This rejection is respectfully traversed to the extent deemed to apply to the claims as amended.

The deficiencies of the primary references are discussed at length above. The additionally-cited Kakiuchi et al reference does not cure such deficiencies, and the rejection should be withdrawn.

Rejection of Claims 3-4 and 6-8 Under 35 USC 103(a)

Claims 3-4 and 6-8 again stand rejected under 35 USC 103(a) as obvious over JP 2000-212866 in view of JP 03-279452, JP 02-112460 and Kobayashi et al. This rejection is respectfully traversed to the extent deemed to apply to the claims as amended.

The deficiencies of the primary references are discussed at length above. The additionally-cited Kobayashi et al reference does not cure such deficiencies, and the rejection should be withdrawn.

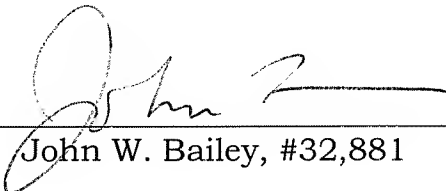
In view of the above, the application is believed to be in condition for allowance, and an early indication of the same is earnestly solicited.


If any questions remain regarding the above matters, please contact Applicant's representative John W. Bailey (Reg. No. 32,881), at the phone number listed below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By 
John W. Bailey, #32,881


JWB/JWH/ej

P.O. Box 747
Falls Church, VA 22040-0747
(703) 205-8000